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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/708,230	11/07/2000	Adam T. Lake	10559/296001/P9307	1146

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FISH & RICHARDSON, PC
4350 LA JOLLA VILLAGE DRIVE
SUITE 500
SAN DIEGO, CA 92122

EXAMINER

CHEN, PO WEI

ART UNIT	PAPER NUMBER
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2697

DATE MAILED: 07/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/708,230

Applicant(s)

LAKE ET AL.

Examiner

Po-Wei (Dennis) Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other: ____

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DETAILED ACTION

In response to Amendment received on May 16, 2003. This action is final.

Claims 1-30 are pending in this application. Claims 1, 11, and 21 are independent claims.

The present title of the invention is "Rendering a Pencil-Sketch Image".

The Group Art Unit of the Examiner case is now 2697. Please use the proper Art Unit number to help us serve you better.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 11, and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaibara (US 5,786,822; refer to as Sakaibara) and further in view of Stokes (US 5,611,030).

3. Regarding claim 1, Sakaibara discloses a method and apparatus for mapping texture on an object displayed comprising:

A method of rendering an image from three-dimensional data ("The present invention relates to display of a three-dimensional graphics image", see lines 10-14 of column 1);

Determining a texture for a polygon defined by the three-dimensional data ("selecting the preset texture data for one of the predetermined view directions corresponding to an actual view direction for each said polygon being actually displayed", see lines 10-13 of column 11);

Projecting the polygon onto a two-dimensional surface; mapping texture onto the polygon to render the image ("A texture mapping method for mapping texture data on each of a

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plurality of polygons constituting a displayed polyhedron on a display screen”, see lines 64-66 of column 10).

Obtaining texture values for vertices of the polygon (see lines 36-42 and lines 60-63 of column 1);

Sakaibara does not disclose in a case where all vertices do not have the same texture value, assigning the texture to the polygon based on a texture value of a majority of the vertices of the polygon; However, this is known in the art taught by Stokes. Stokes teaches a color gamut mapping system that utilize the method (see lines 11-16 of column 17). While claim recites texture and texture value, it is clear that the color of a polygon can be considered as the texture for the polygons (see lines 15-17 of column 2 and Fig. 4, Stokes) and color values corresponds to texture values. It would have been obvious to one of ordinary skill in the art at time of invention to utilize the teaching of Stokes to provide the advantage of providing a greater flexibility in gamut mapping (see lines 31-33 of column 3).

Sakaibara does not disclose pencil-sketch texture, instead, animation was used as an example (see lines 17-21 of column 3). It would have been obvious to one of ordinary skill in the art at the time of invention to realize that the term pencil-sketch has the same function as animation. Also, a pencil sketch is a basic, single frame, primitive of an animation image. Thus, the limitation is met as it would have been obvious to perform the process on images that are similar to the animation example of the references.

4. Regarding claims 11 and 21, the statement presented, above, with respect to claim 1 is incorporated herein.

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5. Claims 2-3, 12-13, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaibara (US 5,786,822; refer to as Sakaibara) and Stokes (US 5,611,030) as applied to claim 1 above, and further in view of Salesin et al. (US 5,847,712; refer to as Salesin herein).

6. Regarding claims 2 and 3, it is noted that the combination of Sakaibara and Stokes does not disclose obtaining a set of pencil-sketch markings; and constructing the pencil-sketch texture using the pencil sketch markings; arranging the pencil sketch markings at a predetermined density such that the pencil sketch markings are at least one of parallel and perpendicular to one another. However, this is known in the art taught by Salesin. Salesin teaches a method and system for generating graphic illustrations that “The stroke texture 38 is comprised of at least one stroke 26 and usually of a plurality of similar type strokes” (see lines 57-67 of column 8 and Fig. 3A-3F). It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the teaching of Salesin to provide “an easy and efficient way to produce pen-and-ink illustrations” (see lines 62-63 of column 4, Salesin).

It is noted that the combination of Sakaibara and Stokes does not disclose pencil-sketch texture, instead, animation was used as an example (see lines 17-21 of column 3). It would have been obvious to one of ordinary skill in the art at the time of invention to realize that the term pencil-sketch has the same function as animation. Thus, the limitation is met.

7. Regarding claims 12-13 and 22-23, the statement presented, above, with respect to claim 2-3 is incorporated herein.

8. Claims 4, 14, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaibara (US 5,786,822; refer to as Sakaibara) and Stokes (US 5,611,030) as applied to claim 1 above, and further in view of Yoshioka et al. (US 6,478,680; refer to as Yoshioka herein).

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9. Regarding claim 4, it is noted that the combination of Sakaibara and Stokes does not disclose selecting a background onto which the image is rendered. However, this is known in the art taught by Yoshioka. Yoshioka teaches a game apparatus and method of displaying moving picture that “The 3D graphics data 201a defines shapes of three dimensional objects to be displayed such as a character object or background objects” (see lines 33-38 of column 9).

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the teaching of Yoshioka to provide the functionality of allowing different backgrounds to be used in creating an image.

It is noted that the combination of Sakaibara and Stokes does not disclose pencil-sketch texture, instead, animation was used as an example (see lines 17-21 of column 3). It would have been obvious to one of ordinary skill in the art at the time of invention to realize that the term pencil-sketch has the same function as animation. Thus, the limitation is met.

10. Regarding claims 14 and 24, the statement presented, above, with respect to claim 4 is incorporated herein.

11. Claims 5-10, 15-20, and 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaibara (US 5,786,822; refer to as Sakaibara) and Stokes (US 5,611,030) as applied to claim 1 above, and further in view of Billyard (US 5,757,321) and Yoshioka. et al. (US 6,478,680; refer to as Yoshioka herein).

12. Regarding claims 5 and 7, Sakaibara discloses a method and apparatus for mapping texture on an object displayed comprising:

Obtaining texture values of the polygon (see lines 36-42 and lines 60-63 of column 1) and assigning texture (see abstract);

The combination of Sakaibara and Stokes does not disclose each value is obtaining based on a normal vector to the polygon and a light vector between the polygon and a light source; the value is obtained by calculating the vector dot product of the normal vector and the light vector. However this is known in the art taught by Billyard. Billyard teaches an apparatus and method for clipping primitive comprising "In the embodiment, the H vector is not calculated and a specular highlight is simulated by considering the dot product of N with L", see lines 30-32 of column 15 and Fig. 5A-B). And classifying the polygon based on a texture value for the polygon ("In the embodiment, the polygon data is arranged in a list so that polygons having a significant level of specular reflection are grouped together", see lines 13-26 of column 14). It is further noted that polygons are grouped according to their specular reflection. And specular reflection calculation involves dot product of N (normal) and L (light) vectors. Also, while claim recites texture value, it is clear that the specular reflection calculation is used to produce color mapping which can be considered as texture mapping for the polygons (see lines 4-7 of column 20).

Thus, limitation of claim is met;

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the teaching of Billyard in place of the similar lighting process of Sakaibara to provide the advantage of reducing computation overhead (see lines 46-48 of column 1 of Billyard).

The combination of Sakaibara and Stokes does not disclose associating the texture with the polygon based on the classification of the polygon though it does perform a texture mapping process. However, this is known in the art taught by Yoshioka. Yoshioka teaches a game apparatus and method of displaying moving picture comprising "each object is represented by a group of polygons constituting its surface...the texture address data respectively designates

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texture data which should be mapped to the object” (see lines 33-44 of column 9). It is further noted that while claim recites classification, the term is broad enough to have the same meaning as grouping polygons. Thus, the limitation of claim is met.

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the teaching of Yoshioka in place of the texturing process of Sakaibara to provide the advantage of reducing the amount of processing required for texture mapping.

It is noted that the combination of Sakaibara and Stokes does not disclose pencil-sketch texture, instead, animation was used as an example (see lines 17-21 of column 3). It would have been obvious to one of ordinary skill in the art at the time of invention to realize that the term pencil-sketch has the same function as animation. Thus, the limitation is met.

13. Regarding claim 6, Sakaibara discloses a method and apparatus for mapping texture on an object displayed comprising:

The normal vector is a vertex normal of the polygon (“a normal vector (n_x, n_y, n_z) at each vertex, see line 34-35 of column 5 and Fig. 3”).

14. Regarding claim 8, it is noted that the combination of Sakaibara and Stokes does not disclose the polygon is classified by associating the polygon with one of M ($M > 1$) bins, each of the M bins corresponding to a predetermined range of values. However this is known in the art taught by Billyard. Billyard teaches an apparatus and method for clipping primitive that “In the embodiment, the polygon data is arranged in a list so that polygons having a significant level of specular reflection are grouped together” (see lines 13-26 of column 14). It is further noted that polygons are grouped according to their specular reflection values. Also, while claim recites bin,

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it would have been obvious to one ordinary skill in the art to realize group functions the same as a bin. Thus, limitation of claim is met;

15. Regarding claim 9, it is noted that the combination of Sakaibara and Stokes does not disclose the texture is associated with the polygon based on which of the M bins into which the polygon falls. However, this is known in the art taught by Yoshioka. Yoshioka teaches a game apparatus and method of displaying moving picture comprising "each object is represented by a group of polygons constituting its surface...the texture address data respectively designates texture data which should be mapped to the object" (see lines 33-44 of column 9). It is further noted that while claim recites bin, it would have been obvious to one ordinary skill in the art to realize group functions the same as a bin. Thus, limitation of claim is met;

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the teaching of Yoshioka to provide the advantage of reducing the amount of processing required for texture mapping.

It is noted that the combination of Sakaibara and Stokes does not disclose pencil-sketch texture, instead, animation was used as an example (see lines 17-21 of column 3). It would have been obvious to one of ordinary skill in the art at the time of invention to realize that the term pencil-sketch has the same function as animation. Thus, the limitation is met.

16. Regarding claim 10, Sakaibara discloses a method and apparatus for mapping texture on an object displayed comprising:

The three-dimensional data defines a three-dimensional model; and the method further comprises: re-positioning the three-dimensional model relative to the two-dimensional surface ("The present invention relates to display of a three-dimensional graphics image" and "A texture

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mapping method for mapping texture data on each of a plurality of polygons constituting a displayed polyhedron on a display screen", see lines 10-14 of column 1 and lines 64-66 of column 10);

Repeating determining, projecting and mapping for a second polygon on the three-dimensional model to render a second pencil-sketch image. This is known as discussed with respect to claim 1, above.

It is noted that the combination of Sakaibara and Stokes does not disclose pencil-sketch texture, instead, animation was used as an example (see lines 17-21 of column 3). It would have been obvious to one of ordinary skill in the art at the time of invention to realize that the term pencil-sketch has the same function as animation. Thus, the limitation is met.

17. Regarding claims 15-20 and 25-30, the statement presented, above, with respect to claim 5-10 is incorporated herein.

Response to Arguments

18. Applicant's arguments filed May 16, 2003 have been fully considered but they are not persuasive.

The applicant argues: the reference does not disclose obtaining texture values for vertices of the polygon, in a case where all vertices do not have the same texture value, assigning the texture to the polygon based on a texture value of a majority of the vertices of the polygon. However, this is known in the art taught by Sakaibara and further in view of Stokes, as statements presented above, with respect to claim 1 are incorporated herein.

The applicant argues: the reference does not disclose provide specular values for individual vertices to provide the function of assigning the texture to the polygon based on a

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texture value of a majority of the vertices of the polygon. However, this is known in the art taught by Sakaibara and Stokes and further in view of Billyard and Yoshioka, as statements presented above, with respect to claims 1 and 5 are incorporated herein.

The applicant argues: the reference does not disclose how texture data for a whole polygon is obtained and assigning the pencil-sketch texture to the polygon based on a texture value of a majority of the vertices of the polygon. However, this is known in the art taught by Sakaibara and Stokes and further in view of Billyard and Yoshioka, as statements presented above, with respect to claims 1 and 5 are incorporated herein. Furthermore, Yoshioka disclose that by utilizing texture address data, the texture data for the polygons are obtained (lines 43-44 of column 9).

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Foran (US 5,805,782) discloses "Method and Apparatus for Projective Texture Mapping Rendered from Arbitrarily Positioned and Oriented Light Source".

Arias (US, 5,966,134) discloses "Simulating cel Animation and Shading".

Suzuoki et al. (US 5,949,969) disclose "Apparatus and Method for Providing Texture of a Moving Image to a Surface of an Object to be Displayed".

Deering (US 4,901,064) discloses "Normal Vector Shading for 3-D Graphics Display System".

Kirk et al. (US 6,239,808) disclose "Method and Apparatus for Determining Texture Values of Graphical Images".

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Kamen et al. (US 5,812,141) disclose "Method and Apparatus for an Adaptive Texture Mapping Controller".

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Po-Wei (Dennis) Chen whose telephone number is (703) 305-8365. The examiner can normally be reached on 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Hofsass can be reached on (703) 305-4717. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-6743 for regular communications and (703) 308-6743 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Po-Wei (Dennis) Chen
Examiner
Art Unit 2697

Po-Wei (Dennis) Chen
July 28, 2003



JOSEPH MANCUSO
PRIMARY EXAMINER